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## ZOOLOGY.

**Kingsley's Vertebrate Zoölogy.** — That the study of vertebrate anatomy in America has passed the period of pure comparison and entered that of a more scientific morphology has become evident by the appearance of a recent work by Dr. John Sterling Kingsley,<sup>1</sup> who thus gains the honor of producing the first American text-book on the subject.

By this we do not mean that there has been any lack of special investigation in the field of vertebrate anatomy, but, as stated in the preface of the work under consideration, "observation and uncorrelated facts do not make a science," and a comprehensive text-book which collects in a system the results of this series of investigations has hitherto been lacking in our literature. The place of such a work has been supplied up to the present time by European text-books, among which may be first mentioned the *Grundriss* of Wiedersheim (latest edition 1898) and the new edition of Gegenbaur, of which the first part has just appeared; but in these the disadvantage of a foreign language, the lapse of time which must necessarily ensue before they can appear in translation, and the exotic character given by the frequent references to animals exclusively European emphasize the need of an American manual illustrated by American material. In this respect it becomes a matter of satisfaction to glance through the pages of Kingsley's work and find *Acanthias*, *Necturus*, *Amblystoma*, and *Sceloporus* in place of *Scyllium*, *Proteus*, *Salamandra*, and *Lacerta*.

The object of the book, as stated by the author, is "to supplement both lectures and laboratory work and to place in concise form the more important facts and generalizations concerning the vertebrates," and its employment as collateral reading for the student will emancipate the lecturer from the necessity of continually reiterating the elementary principles of the subject. Its use in the laboratory, also, where it will assist the student in finding out what he wishes to know, will be a pleasing change from the usual laboratory manual, with its too carefully tabulated series of observations, a style of literature which it is as easy for an author to write as it is difficult for another to follow.

In arrangement Dr. Kingsley's text-book is divided into two parts,

<sup>1</sup> Kingsley, J. S. *Text-Book of Vertebrate Zoölogy*. New York, Henry Holt & Co., 1899.

the first being morphological, and the second systematic. In the first part the work is based entirely on embryology, and an introduction which sketches the main features of development is succeeded by the morphology of the organs arrayed in accordance with the germ layers. Although logically there is much to be said in favor of such an arrangement, it would seem hardly an improvement on the usual method, which begins with the skeleton and muscles, and thus presents a framework that may serve as a series of relations by means of which the other systems may be more easily described. Although permissible for an elementary text-book of general morphology where there is little or no descriptive anatomy, it would not seem possible to employ such an arrangement in a work upon the anatomy of a single animal, for historically the nomenclature of the bones was the first established, and organs and parts of organs have been named with reference to these, or to other parts which, in the usual order, precede them. A second difficulty is that it is impossible to remain consistent to such a plan, or if strict consistency be carried out, it is then necessary to separate most widely organs which should be treated together. Thus, in the treatment of gills (p. 22), it becomes logically advisable to speak of the external "gills" of amphibians which are strictly ectodermic and which, with due regard to the arrangement of the book, should come in with the integument (about p. 90). Again, scales are treated under the division "ectodermal structures," but these include the scales of teleosts which, in their completed state, are entirely mesenchymatous, and also the scales of Selachians which possess a double origin. The subject of teeth, though strictly homologous with the latter organs, appears with the "endodermal organs," although their origin is made clear in the text, while dermal or membrane bones are treated under "skeleton." It is of course impossible by any arrangement always to bring correlated parts into close juxtaposition, but an arrangement which separates so widely three such closely related structures as placoid scales, teeth, and dermal bones is certainly unfortunate.

In the arrangement and nomenclature of the embryonic layers, the author has employed the very convenient terms "mesothelium" and "mesenchyme" for the two structures which arise between ectoderm and endoderm, and thus leaves the word "mesoderm" to be employed as a comprehensive term for both structures. It remains to be seen, however, whether the replacement of the terms "invagination" and "evagination" by the Saxon "inpushing" and "outpush-

ing" will be more favorably received than have been the many attempts to find a substitute for the German "Anlage."

The verbal nouns referred to must imply such verbs as "to inpush" and "to outpush," and these forms are, as a matter of fact, employed, as, for instance (p. 19), "becomes inpushed into the deeper layers," but upon the same page the expression "pushed inside" and also the noun "ingrowth" appear, thus causing some confusion.

A characteristic which impresses one especially favorably is the extreme conciseness and concentration shown in the entire work, which, at the same time, does not prevent the description from being more than usually clear and comprehensive. An especially good illustration of this is seen in the morphological description of the skull, in which the entire subject is covered within the limits of seventeen pages, and yet every essential point is fully treated (pp. 150-167).

The second part of the work is called the "Classification of Vertebrates," but in reality it gives not only the enumeration of the groups, but also presents so many anatomical details that it may be used as a special comparative anatomy filled with the details which were not possible in the first part. Thus, if a student is in search of a special point in the anatomy of any animal, he should first read the morphological description of the organ as given in the first part, and then turn successively to the descriptions of the class, order, and the smaller subdivisions within which the animal in question is found. This seems an excellent arrangement and may be the cause of the extreme conciseness of the first part, as it avoids clogging the exposition of the theories with concrete examples, as in the majority of the text-books on the subject. Especially noticeable in the second part is the treatment of the reptiles, which are completed by the addition of the fossil orders; and that of birds, which gives the new classification founded upon anatomical characters.

The work is illustrated by 378 text-figures, of which about 150 are original and new.

Recent monographs have contributed several which thus appear for the first time in a text-book (Ex. Figs. 120, 139, 160, 161). Among the new figures there are some exceptionally clear diagrams, such as Figs. 35, 61, 62, 110, and a series illustrating the relationship of the various cavities of the body (Figs. 111, 127, etc.).

At places where we are accustomed to meet certain time-worn figures there is some relief in finding either a new object employed or,

at least, new figures representing the old object (Ex. Figs. 4, 6, 116, 118, 140).

There is a small number of the inevitable verbal errors, of which may be noted : *foramen lacerus anterior* (p. 164), Fascia used as a plural (p. 112), and Malapterus (p. 115).

**A New Text-Book on the Nervous System.** — No field of zoölogical research has been more assiduously cultivated or has yielded more important results in the last decade than the nervous system. While the cell theory and the interpretation of most tissues in conformity with it are matters of history, the conception of the nervous system as an association of cells dates really from 1891. With the enunciation of the neurone theory by Waldeyer in that year, a new era in the study of the nervous system began ; and though this theory may require modification even in some fundamental respects, it has been undoubtedly a most important factor in bringing order into what was neurological chaos. The result of this clarifying influence has been, not only an enormous productivity in effective research, but the appearance of several high-grade text-books dealing with the nervous system from the new standpoint. Ramon y Cajal's well-known brochure heads the list as the first consistent attempt to describe the nervous system of the higher animals as an aggregate of neurones. The same principle was adopted in van Gehuchten's text-book, and to a less extent in the more conservative treatises by Edinger and by von Lenhossék, and is accepted by the well-known American neurologist, L. F. Barker, in his new text-book entitled *The Nervous System and its Constituent Neurones*.<sup>1</sup>

The book, though divided into six sections, which are further subdivided into chapters, falls naturally into two parts : the first, comprising the first five sections of a little over 300 pages, contains a general account of the structure and physiology of the nervous unit or neurone ; and the second, including only the sixth section of some 650 pages, presents a descriptive account of the groups of neurones constituting the nervous system of man and other higher mammals.

To the general reader the first five sections are naturally the more interesting. The first section is given to an historical account of the development of the neurone concept. This opens with a description

<sup>1</sup> Barker, L. F. *The Nervous System and its Constituent Neurones*, designed for the Use of Practitioners of Medicine and of Students of Medicine and Psychology. New York, Appleton & Co. xxxii + 1122 pp., 676 illustrations, and 2 colored plates.